

REMARKS

Applicants have amended the specification to include a reference to Government rights. No new matter has been added.

In the Office Action, claims 1-3, 8, and 9 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,170,474 to Israel (“Israel”).

Applicants respectfully submit that the Section 102(b) rejection of claims 1-3, 8, and 9 should be withdrawn because Israel does not disclose each of the features of independent claims 1, 8, and 9. More specifically, Israel does not disclose the method of claim 1, including, among other features, “varying operation of an intake valve . . . to an open duration sufficient to maintain a desired quantity of fresh air from [an] intake manifold to [a] cylinder” In addition, Israel does not disclose the method of claim 8, which includes “extending an open duration of an intake valve . . . to a duration sufficient to maintain a quantity of fresh air from [an] intake manifold to a level below a desired threshold.” Further, Israel does not disclose an apparatus, as recited in claim 9, which includes “means for varying operation of [an] intake valve to an open duration sufficient to maintain a desired quantity of fresh air from [an] intake manifold to [a] cylinder”

Israel at col. 6, lines 6-11 generally mentions that both an exhaust valve actuating subsystem 300 and an intake valve actuating subsystem 350 may be controlled by a controller 600. Nothing in Israel, however, provides any disclosure of how the intake valve actuating subsystem 350 may be controlled by the controller 600. For example, although Israel discloses that “the controller 600 may vary the opening

times, closing times, and magnitude of lift of [an] exhaust valve 34 . . ." (col. 6, lines 44-46), Israel lacks any such disclosure for Israel's intake valve 32.

Simply stated, Israel fails to disclose either varying operation or extending an open duration of an intake valve. Israel's mere mention of an intake valve actuating subsystem 350 that may be controlled by a controller 600 (col. 6, lines 6-11) does not provide any express, implicit, or inherent teaching of varying operation of an intake valve or extending an open duration of an intake valve. Consequently, Israel does not disclose "varying operation" of an intake valve "to an open duration sufficient to maintain a desired quantity of fresh air from [an] intake manifold to [a] cylinder," as recited in claims 1 and 9. In addition, Israel does not disclose "extending an open duration of an intake valve . . . to a duration sufficient to maintain a quantity of fresh air from [an] intake manifold to a level below a desired threshold," as recited in claim 8.

For at least these reasons, the Section 102(b) rejection of independent claims 1, 8, and 9 should be withdrawn.

In addition, the Section 102(b) rejection of claims 2 and 3, which depend from claim 1, should be withdrawn for at least the same reasons the rejection of claim 1 should be withdrawn. Furthermore, the rejection of those dependent claims should be withdrawn because Israel lacks any disclosure of the method of claim 2, which recites "controlling the quantities of residual exhaust gas and fresh air . . . to increase the temperature in the cylinder to a desired level." Rather than having any disclosure concerning the increasing of cylinder temperature, Israel refers to engine operation such that temperature and pressure in the exhaust manifold 26, cylinder, or other components do not exceed engine limits. (See col. 6, lines 6-11 and 49-60; and col. 7,

lines 1-7.) Thus, Israel is focused on keeping temperature and pressure below upper engine limits without having any disclosure of increasing temperature.

Claims 4-6 were rejected under 35 U.S.C. 103(a) based on Israel in view of U.S. Patent No. 6,321,731 to Russ et al. ("Russ et al.").

Applicants respectfully submit that the Section 103(a) rejection of claims 4-6 should be withdrawn because the Office Action does not set forth a *prima facie* showing of obviousness. To meet the initial burden of establishing a *prima facie* case of obviousness, three basic criteria must be satisfied. First, the prior art references must teach or suggest all of the claim limitations. *M.P.E.P.* § 2143. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *Id.* Finally, there must be a reasonable expectation of success. *Id.*

Neither Israel nor Russ et al. discloses or suggests all of the features of claims 4-6. As acknowledged in the Office Action at p. 3, Israel does not disclose all of the features of claim 4, including "extending the open duration of [an] intake valve beyond a normal open duration." In addition, Russ et al. lacks disclosure of those recited features of claim 4. More specifically, Russ et al. discloses an engine control strategy including a cam phase of an intake valve being shifted without changing the intake valve's open duration.

For example, Figs. 3a and 3b of Russ et al. show no change in the open duration of an intake valve when shifting cam phases from the valve timing of Fig. 3a to the valve timing of Fig. 3b. Fig. 3a of Russ et al. illustrates an intake valve being opened at 10

degrees before piston top dead center ("TDC") and closed at 54 degrees beyond piston bottom dead center ("BDC"), resulting in the intake valve being open for a total duration of 244 degrees (i.e., 10 degrees before TDC + 180 degrees between TDC and BDC + 54 degrees after BDC). Fig. 3b of Russ et al. shows the intake valve being open for the same total duration of 244 degrees (i.e., 160 degrees between the intake valve opening and BDC + 84 degrees after BDC). Since each of Figs. 3a and 3b illustrates the same intake valve open duration of 244 degrees, those figures do not disclose extending the open duration of an intake valve beyond a normal open duration.

Accordingly, regardless of whether Israel and Russ et al. are considered alone or in combination, they do not disclose or suggest "extending the open duration of [an] intake valve beyond a normal open duration," as recited in claim 4.

In addition to the fact that Israel and Russ et al. do not disclose or suggest all of the features of claim 4, there is no *prima facie* case of obviousness because one of ordinary skill in the art would not have had any sufficient motivation or suggestion to combine the subject matter of those references. For example, Israel and Russ et al. teach away from one another. To be more specific, Israel relates to varying the opening times and closing times of an exhaust valve 34 (col. 6, lines 44-46) independent of the operation of an intake valve 32. Russ et al., on the other hand, is concerned with shifting the cam phases of both an intake valve and an exhaust valve in an equal manner, so that any change of exhaust valve timing is tied together with a corresponding change of intake valve timing. Accordingly, the references teach away from one another and any attempt at combining them in the hypothetical manner proposed in the Office Action would destroy their fundamental principles of operation.

For at least these reasons, the Section 103(a) rejection of claims 4-6 should be withdrawn.

Claims 7 and 10-14 were rejected under 35 U.S.C. 103(a) based on Israel in view of U.S. Patent No. 6,772,742 to Lei et al. (“Lei et al.”).

Applicants respectfully submit that the Section 103(a) rejection of claims 7 and 10-14 should be withdrawn because there is no *prima facie* case of obviousness. For example, with regard to claim 10, neither Israel, Lei et al., nor any combination thereof teaches or suggests “a controller electrically connected to the turbocharger and variable intake valve systems for controlling the turbocharger system to increase a back pressure associated with [an] exhaust manifold, and for controlling the variable intake valve system to vary an open duration of [an] intake valve, wherein the back pressure and the open duration of the intake valve are controlled to respectively maintain a desired increased quantity of residual exhaust gas and a desired decreased quantity of fresh air in [a] cylinder, such that the temperature in the cylinder is maintained at a desired level.” For example, Lei et al. does not even refer to cylinder temperature and has no disclosure of cylinder temperature being maintained at a desired level. Further, Lei et al. lacks any disclosure of back pressure and an open duration of an intake valve being controlled to respectively maintain a desired increased quantity of residual exhaust gas and a desired decreased quantity of fresh air in a cylinder, such that cylinder temperature is maintained at a desired level.

In addition to the fact that there is no disclosure or suggestion of all of the features of claim 10, Applicants respectfully submit that one of ordinary skill in the art would not have had any sufficient motivation or suggestion to combine Israel and

Lei et al. as proposed in the Office Action. As discussed above, the primary focus of Israel relates to varying the opening times, closing times, and lift magnitude of an exhaust valve (col. 6, lines 44-46) without having any concern for details of intake valve operation. Accordingly, one of ordinary skill in the art would not have had any suggestion or motivation to refer to Lei et al. to make any modification to intake valve timing.

Contrary to the Office Action, Applicants respectfully submit that one of ordinary skill in the art also would not have had any suggestion or motivation to modify the subject matter of Israel to result in a method involving at least one variable geometry turbine in a turbocharger system, as recited in claim 7, or an apparatus including one or more variable geometry turbochargers, as recited in claims 11-13. Although Lei et al. mentions a variable-nozzle turbocharger (VNT), one of ordinary skill in the art would not have had any sufficient motivation or suggestion to modify Israel to include such a turbocharger, especially in light of the increased complexity of such a turbocharger as compared to a turbocharger lacking a variable nozzle. Moreover, contrary to the general assertion in the Office Action, more than one turbocharger, as recited in claim 12, would not have been an obvious design choice.

Consequently, the Section 103(a) rejection of claims 7 and 10-14 should be withdrawn.

For at least the reasons explained above, all of the pending claims should be allowable. If the Examiner believes the present response does not place the application in condition for immediate allowance, the Examiner is respectfully requested to call Applicants' undersigned representative (571-203-2774) to schedule an interview.

Applicants respectfully requests reconsideration of this application, the withdrawal of all of the claim rejections, and the timely allowance of the pending claims.

The Office Action contains a number of statements relating to the claims of the present application and the cited references. Applicants decline to subscribe to any statement in the Office Action, regardless of whether it might be specifically mentioned above.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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Dated: February 15, 2005

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